Please provide the following information, and submit to the NOAA DM Plan Repository.

Reference to Master DM Plan (if applicable)

As stated in Section IV, Requirement 1.3, DM Plans may be hierarchical. If this DM Plan inherits provisions from a higher-level DM Plan already submitted to the Repository, then this more-specific Plan only needs to provide information that differs from what was provided in the Master DM Plan.

URL of higher-level DM Plan (if any) as submitted to DM Plan Repository:

1. General Description of Data to be Managed

1.1. Name of the Data, data collection Project, or data-producing Program:

AFSC/RACE/SAP/Long: Effects of ocean acidification on respiration, feeding, and growth of juvenile red and blue king crabs (Paralithodes camtschaticus and P. platypus)

1.2. Summary description of the data:

Juvenile red and blue king crabs (Paralithodes camtschaticus and P. platypus) were exposed to three pH levels: ambient (pH 8.1), pH 7.8, and pH 7.5 for three weeks. Oxygen consumption and feeding ration were determined immediately after exposure to treatment water and after three weeks exposure. Growth can be calculated from the wet mass observations.

1.3. Is this a one-time data collection, or an ongoing series of measurements?

One-time data collection

1.4. Actual or planned temporal coverage of the data:

2013-06 to 2013-07

1.5. Actual or planned geographic coverage of the data:

W: -152.395268, E: -152.395268, N: 57.782403, S: 57.782403
Kodiak Laboratory

1.6. Type(s) of data:

(e.g., digital numeric data, imagery, photographs, video, audio, database, tabular data, etc.)
Table (digital)

1.7. Data collection method(s):

(e.g., satellite, airplane, unmanned aerial system, radar, weather station, moored buoy, research vessel, autonomous underwater vehicle, animal tagging, manual surveys, enforcement activities, numerical model, etc.)
Instrument: n/a
Platform: n/a
Physical Collection / Fishing Gear: n/a

1.8. If data are from a NOAA Observing System of Record, indicate name of system:

1.8.1. If data are from another observing system, please specify:

2. Point of Contact for this Data Management Plan (author or maintainer)

2.1. Name:
Metadata Coordinators MC

2.2. Title:
Metadata Contact

2.3. Affiliation or facility:

2.4. E-mail address:
AFSC.metadata@noaa.gov

2.5. Phone number:

3. Responsible Party for Data Management
Program Managers, or their designee, shall be responsible for assuring the proper management of the data produced by their Program. Please indicate the responsible party below.

3.1. Name:
Chris Long

3.2. Title:
Data Steward

4. Resources
Programs must identify resources within their own budget for managing the data they produce.

4.1. Have resources for management of these data been identified?
No

4.2. Approximate percentage of the budget for these data devoted to data management (specify percentage or "unknown"):
Unknown

5. Data Lineage and Quality
NOAA has issued Information Quality Guidelines for ensuring and maximizing the quality, objectivity, utility, and integrity of information which it disseminates.

5.1. Processing workflow of the data from collection or acquisition to making it publicly accessible
(describe or provide URL of description):
Process Steps:

- During the experiment, crabs were held in individual cells made out of PVC pipe with mesh bottoms that were placed in three larger experimental tubs. Cells each received flow-through water and were large enough to not cause stress to the animals. Crab were fed Gelly Belly (above) three times a week to excess during the experiment. The temperature was maintained at 5°C, which is well within the thermal tolerance range for both species (Long and Daly in review), in each tub using a recirculating chiller. Each of the tubs was fed with flow through seawater at one of three pHs. To acidify seawater, CO2 was bubbled into seawater to reduce the pH to 5.5. This water was mixed with ambient filtered seawater into treatment head tanks. The flow rate of pH 5.5 water was controlled via feedback from pH probes in the head tanks that adjusted the speed of peristaltic pumps. Three pH treatments were used, ambient (pH ~8.1), pH 7.8 (pH expected in global surface waters in ~2100) and pH 7.5 (~2200). The pH and temperature were measured in a randomly selected cell in each treatment once a day using a Durafet III pH probe that was calibrated daily in TRIS buffer. Weekly water samples from each treatment were taken, poisoned with mercuric chloride, and sent to an analytic laboratories for dissolved inorganic carbon (DIC) and total alkalinity (TA) analysis. DIC and TA were determined using a VINDTA 3C (Marianda, Kiel, Germany) coupled to a 5012 Coulometer (UIC Inc., Joliet, IL) using Certified Reference Material from the Dickson Laboratory.
- In this experiment, we measured respiration and feeding ration crabs both immediately after exposure to treatment water and after 3 weeks acclimation period in treatment water. Three weeks exposure time was selected, in part, because, after that, the mortality rate of juveniles in the lowest pH treatment was likely to result in too low a sample size. Sample size was 6 crabs per species per treatment except for red king crab at pH 7.5 which we increased to 10 crabs in anticipation of a higher mortality rate at that treatment. As no more than five respirometry measurements could be made per day, trials for individual crabs were staggered and crabs were started in a random order. Part way through beginning the experiment, an equipment failure caused mass mortality in the pH 7. 5 treatment. The affected crabs were replaced with new one and the initial respiration/feeding trials re-run. Each crab was starved for 1 day prior to measuring the respiration and feeding ration to standardize hunger levels. Each day the respiration trials for that day would be performed and the crabs placed into their cells in the experimental tubs. Respiration was measured in a 5 ml Plexiglas cell with an integrated Clark electrode oxygen sensor that recorded the O2 concentration continually. The sensor was calibrated daily with a two point calibration procedure. The cell was jacketed in by a secondary chamber that allowed flow-through water to maintain the cell at a constant temperature and the whole apparatus was placed inside a temperature controlled room at 5°C. To measure respiration rates, crabs were placed into the cell with a known volume of water at the treatment pH. Trials were run for 1.25-1.5 h. Immediately after the trial the crab was removed from the chamber it was blotted dry and the wet mass was determined. The rate of oxygen consumption in the cell was determined by

determining the slope of the oxygen concentration over time once the trend became linear and was normalizing to the mass of each crab. After the respiration trials, the crab were placed in their holding cells in the experimental tubs. Feeding ration was determined the same day as respiration measurements were taken. A pre-massed piece of squid mantle (blotted dry) ~50% of the mass of the crabs was placed into each cell and the crab was allowed to feed for 24 h after which the remaining food was collected, blotted dry, and massed. As the red king crab were smaller than the blue king crab the mass of food given to each species differed accordingly. Control trials without crabs were performed in each pH treatment for each species (to account for any potential difference in the initial mass of the samples) with 3 replicates of each pH/species combination. On average, the mass of squid increased by 0.8 ± 7.8% (SE) and did not differ among either pH treatments (2-way ANOVA, $F_{2,13} = 0.184$, $p = 0.834$) or species (2-way ANOVA, $F_{1,13} = 1.318$, $p = 0.272$) so the overall mean was used when calculating the feeding ration. The mass of food consumed was determined and the feeding ration calculated as the percent of the crab's mass consumed corrected for mass change in control trials. The crabs were held in their treatment water for ~21 days (range 20-24 d) and checked daily for moults or mortalities. Then the respiration and feeding ration for each crab was determined a second time in the same way as above.
- The pH treatment the crab was in or the observation was made in. Control = pH of ambient water coming into the Kodiak Lab; pH 7.8- water adjusted to a pH 0f 7.8 with CO2. pH 7.5- water adjusted to a pH of 7.5 pH was taken using Durafet pH probe, accuracy between 0.01 and 0.03. Salinity values represented in practical salinity units. Blank cells indicate no data was taken or missing data. Alkalinity values represented in micromoles per kilogram. Blank cells indicate no data was taken or missing data. DIC (dissolved inorganic carbon) is also known as the total CO2 and is represented in micromoles per kilogram. Blank cells indicate no data was taken or missing data. Species: BKC = blue king crab; RKC = red king crab. Time Indicates whether the measurement was made at the beginning (Initial) or end (Final) of the experiment. Initial = measurement made immediately after crab was exposed to treatment water. Final = measurement made after crab was exposed to treatment water for approximately 3 weeks.

5.1.1. If data at different stages of the workflow, or products derived from these data, are subject to a separate data management plan, provide reference to other plan:

5.2. Quality control procedures employed (describe or provide URL of description):
unknown

6. Data Documentation
The EDMC Data Documentation Procedural Directive requires that NOAA data be well documented, specifies the use of ISO 19115 and related standards for documentation of new data, and provides

links to resources and tools for metadata creation and validation.

6.1. Does metadata comply with EDMC Data Documentation directive?
No

6.1.1. If metadata are non-existent or non-compliant, please explain:
Missing/invalid information:
- 7.2. Name of organization of facility providing data access

6.2. Name of organization or facility providing metadata hosting:
NMFS Office of Science and Technology

6.2.1. If service is needed for metadata hosting, please indicate:

6.3. URL of metadata folder or data catalog, if known:
https://www.fisheries.noaa.gov/inport/item/36615

6.4. Process for producing and maintaining metadata
(describe or provide URL of description):
Metadata produced and maintained in accordance with the NOAA Data Documentation Procedural Directive: https://nosc.noaa.gov/EDMC/DAARWG/docs/EDMC_PD-Data_Documentation_v1.pdf

7. Data Access
NAO 212-15 states that access to environmental data may only be restricted when distribution is explicitly limited by law, regulation, policy (such as those applicable to personally identifiable information or protected critical infrastructure information or proprietary trade information) or by security requirements. The EDMC Data Access Procedural Directive contains specific guidance, recommends the use of open-standard, interoperable, non-proprietary web services, provides information about resources and tools to enable data access, and includes a Waiver to be submitted to justify any approach other than full, unrestricted public access.

7.1. Do these data comply with the Data Access directive?
No

7.1.1. If the data are not to be made available to the public at all, or with limitations, has a Waiver (Appendix A of Data Access directive) been filed?
No

7.1.2. If there are limitations to public data access, describe how data are protected from unauthorized access or disclosure:
There are no legal restrictions on access to the data. They reside in public domain and can be freely distributed.

7.2. Name of organization of facility providing data access:

7.2.1. If data hosting service is needed, please indicate:

No

7.2.2. URL of data access service, if known:
https://noaa-fisheries-afsc.data.socrata.com/Species/36615-RACE-2013-BKC-RKC-Ocean-Acidification-Cr

7.3. Data access methods or services offered:
unknown

7.4. Approximate delay between data collection and dissemination:
Unknown

7.4.1. If delay is longer than latency of automated processing, indicate under what authority data access is delayed:
no delay

8. Data Preservation and Protection

The NOAA Procedure for Scientific Records Appraisal and Archive Approval describes how to identify, appraise and decide what scientific records are to be preserved in a NOAA archive.

8.1. Actual or planned long-term data archive location:
(Specify NCEI-MD, NCEI-CO, NCEI-NC, NCEI-MS, World Data Center (WDC) facility, Other, To Be Determined, Unable to Archive, or No Archiving Intended)
NCEI_MD

8.1.1. If World Data Center or Other, specify:

8.1.2. If To Be Determined, Unable to Archive or No Archiving Intended, explain:

8.2. Data storage facility prior to being sent to an archive facility (if any):
Kodiak Fisheries Research Center - Kodiak, AK

8.3. Approximate delay between data collection and submission to an archive facility:
unknown

8.4. How will the data be protected from accidental or malicious modification or deletion prior to receipt by the archive?
Discuss data back-up, disaster recovery/contingency planning, and off-site data storage relevant to the data collection
IT Security and Contingency Plan for the system establishes procedures and applies to the functions, operations, and resources necessary to recover and restore data as hosted in the Western Regional Support Center in Seattle, Washington, following a disruption.

9. Additional Line Office or Staff Office Questions

Line and Staff Offices may extend this template by inserting additional questions in this section.